

University of Groningen

**Luctor et emergo, exploring contextual variance in factors that enable adolescent resilience to flooding**

de Milliano, Cecile

*Published in:*  
International Journal of Disaster Risk Reduction

*DOI:*  
[10.1016/j.ijdrr.2015.07.005](https://doi.org/10.1016/j.ijdrr.2015.07.005)

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*  
Publisher's PDF, also known as Version of record

*Publication date:*  
2015

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

de Milliano, C. (2015). Luctor et emergo, exploring contextual variance in factors that enable adolescent resilience to flooding. *International Journal of Disaster Risk Reduction*, 14(2), 168-178.  
<https://doi.org/10.1016/j.ijdrr.2015.07.005>

**Copyright**

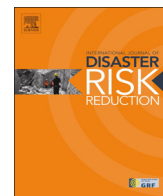
Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

**Take-down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.



# Luctor et emergo, exploring contextual variance in factors that enable adolescent resilience to flooding



C.W.J. de Milliano

University of Groningen, Globalisation Studies Groningen, The Department of International Relations and International Organisations, The Netherlands

## ARTICLE INFO

### Article history:

Received 31 December 2014

Received in revised form

4 July 2015

Accepted 12 July 2015

Available online 29 August 2015

### Keywords:

Resilience

Flooding

Adolescents

Internal and external enabling factors

Contextual variance

## ABSTRACT

Knowing that by 2020, 175 million children and adolescents are expected to annually be affected by “natural” disasters, this article sets out to explore what factors enable their resilience. It additionally questions to what extent resilience enabling factors are similar across the globe, or context-specific. It draws on quantitative empirical evidence ( $N=1887$  adolescents) from flood prone areas in Indonesia, Burkina Faso and Bolivia. A resilience-enabling model, containing three internal factors (cognitive, behavioral, spiritual) and four external resilience factors (social, political, economic and environmental) is studied. The findings firstly show that what enables resilience is not an either-or matter, but that in chorus, both individual traits as well as socio-environmental resources have a protective function. Secondly, regardless of the adolescents' context, especially spirituality and social relations are perceived most helpful. Eye-catching is that these non-Western adolescents show a high sense of duty and high levels of empathy and responsiveness to others. Larger differences are found when it concerns the protective function of the cognitive, physical environmental and economic factor. Thirdly what helps adolescents to deal with flooding proves to be influenced by their sex, age and exposure to flooding. Male adolescents' experience more support than the females, from both the internal and external factors. In addition, as the adolescents' age increases, the protective function of the internal resilience factors (cognitive and behavioral) increases and that of the external factors (economic and physical-environmental) decreases. The study concludes that when aiming to enhance adolescent resilience, it is of great importance to understand resilience as a multi-factorial concept and to identify when to assume likeness and when to take context specific approaches.

© 2015 Elsevier Ltd. All rights reserved.

## 1. Introduction

Adversity comes in many forms of which environmental calamities are a frequent cause. The Annual Disaster Statistical Review cited that on average each year, between 2003 and 2012, 338 disasters occurred, killing more than 106 thousand people worldwide and affecting over 216 million others [35]. Although lower than usual, in 2013 alone, hydrological disasters occurred 159 times and represented 48% of the total amount of disasters.

These figures highlight that on a frequent basis around the globe, floodwater sweeps along people's belongings, destroys their livelihoods and has lethal consequences. And although disasters occur across the globe, the impacts are unevenly distributed since 98% of the people most affected are living in countries in the Global South [64, p. 2]. In 2014, the worldwide population was 7.2 billion of which 6 billion lived in economically less developed countries [65]. Moreover, in that same year, the share of global population under age 20 was about 35% and this was 48% for a continent like Africa. Children and adolescents (the young) in the

Global South are thus a significant group of those who need to deal with the hardship caused by flooding.

Reflecting on the youngsters that need to struggle, overcome and adjust to adversity, numerous questions arise. What enables them to be resilient? Which factors enable them to navigate and negotiate their way through the stresses and tensions that they are exposed to? Is it nature (individual traits) or is it more about what the environment provides them? And to what extent are the factors that enable adolescents to be resilient to flooding similar across the globe, or context-specific?

As the title “*luctor et emergo*” (“I struggle and emerge”) suggests, the aim of this article is to present insights on those who need to struggle due to flooding and how they subsequently emerge. It sets out to scrutinize streams that cause terrible destruction but also streams that enable adolescents to respond to, recover from and adapt to the destructive forces of flooding. Within resilience research, scholarly debate exists if resilience is predominantly enabled by individual traits or rather by one's social and physical ecology [51,77,75,9,58]. But in the case that

flooding occurs, which type is most enabling? Moreover, scholars such as Boyden and Mann formulate the view that: “*culture is not a mere variable (...) but a major generative force: it is the lens through which we view the world, learn skills in survival and coping, and interpret and respond to our experiences*” [10, p. 20]. However, are culture and context really such “major generative forces” when it concerns resilience enabling factors?

The key objective of this article is to identify what factors enable adolescents to be resilient to flooding and to explore to what extent and why these factors are generic or context specific. Four specific research questions are explored:

1. What factors enable adolescent resilience and to what effect?
2. To what extent is adolescent resilience enhanced by internal or external factors?
3. To what extent is variance in the enabling function of the resilience factors, caused by context?
4. To what extent are differences explained by gender, age and exposure to flooding?

The article starts by setting the context of the study and presenting the materials and methods, followed by an explanation of the theory (Section 3). Thereafter Section 4 presents the findings, which are discussed in more detail in Section 5. Various key conclusions are also drawn in this final section.

## 2. Materials and methods

This article draws on the findings of a larger (Ph.D.-) research that set out to study adolescent resilience to flooding in a global context. Indonesia, Burkina Faso and Bolivia were used as instrumental cases. Methodologically the larger study was typified as a multi-strategy research project and thus quantitative and qualitative research methods were integrated within that single study. Empirical data were gathered between 2009 and 2011 by a lead Ph.D. researcher and local research assistants, in all three countries. The employed methods were adolescent-centered participatory rural appraisal activities, interviews, focus group discussions, unstructured (participant) observation, and a questionnaire ( $N=1887$  adolescents) For the larger study and more details on the methodology, methods and questionnaire see de Milliano [38]. This article is predominantly based on the statistical analysis of the questionnaire and some of the qualitative findings. Before moving on to the methods the following section briefly explains why these cases were chosen and with whom the research was performed.

### 2.1. Research settings and research sample

Research was performed in rural flood-prone areas in Indonesia, Burkina Faso and Bolivia. Although the countries might not account for most flood occurrences and flood victims, they are climatically volatile areas that are increasingly affected by flooding (for Indonesia see i.e.: [87,37]; for Burkina Faso: [68,6,33]; for Bolivia: [82,63,24]. All three countries are experiencing patterns of temperature changes and precipitation, leading to a higher frequency, magnitude, and intensity of floods [34]. Moreover the three countries account for culturally diverse contexts, which makes it interesting to explore similarities and disparities in the

enabling function of the resilience factors. Finally, the three countries were chosen because academic and logistical links existed in all three countries. This made it possible to conduct the field research, which is so widely set-up geographically, in the given time frame.

In terms of flood experience and exposure, statistics show that the Indonesian and Bolivian context have historically speaking had most flooding, but also that in Burkina Faso, flooding is becoming an increasingly common event [11,22,25–27,33,40,41,56]. In the three countries, research sites were chosen in areas where general flood risk exists, caused by either river or dam flooding and where, at times, risk is caused by flash flooding. In Indonesia the questionnaire was conducted in the Pati Regency, which is located on the North Coast of the Central Java Province. Flood-prone villages in the Centre-North (Tougouri) and the South-West (Midebdo) were chosen as research areas for the questionnaire in Burkina Faso. Finally, the Amazonian lowlands of the Beni Department, in the Northwest of Bolivia were elected as the third case study area for the questionnaire. Although poverty and vulnerability are by no means always associated with each other, less affluent areas were chosen since generally, “the poor suffer more from hazards than the wealthy” (Chan and Parker in [30, p. 49]).

Although adolescence is difficult to define, in this study it refers to the transitional period between childhood and the attainment of adult social status [43, p. 2, [85], p. xvii]. This definition is perceived most applicable since it does justice to it as a period in itself. Youth on the other hand is viewed as a period “*in between childhood and adulthood, and is often defined according to age which ranges from age groups such as 13–19 to 10–19 to 15–24*” (Bruce and Chong [13]: 1 in [23, p. 11]). Adolescents, referring to those aged 10–19 years, form a noteworthy proportion of the total population in the three countries. Based on figures from UNICEF, as a proportion of the total population in Burkina Faso they form 23%, in Bolivia 22% and they represent 18% of the Indonesian population [81, pp. 130–131]. To reach representativeness, sample units and respondents in each of the three case studies, were chosen in a systematic and objective manner, with inclusion criteria. The set of “criteria” (requirements) that guided the choice of the respondents were: age (between 11 and 24 years), experience with flooding (at least once) and residence in rural or semi-urban flood prone and economically less wealthy area.

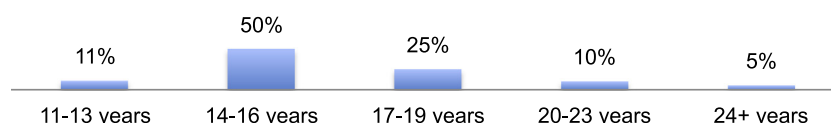
In total 1887 adolescents filled in the questionnaire, of which 602 in Indonesia (32% of all respondents), 582 in Burkina Faso (31% of all respondents) and 703 in Bolivia (37% of all respondents). Of those who participated in the questionnaire, the average age was 16.43 years and a slight majority was female (52%,  $N=974$ ). Graph 1 shows the age distribution of the respondents.

Of the adolescents 12% ( $N=226$ ) was married and 12% ( $N=225$ ) had at least one child. The majority of the adolescents went to school (71%,  $N=1326$ ), performed unpaid work (74%,  $N=1376$ ) and a smaller share identified to have a paid job (21%,  $N=394$ ).

### 2.2. Adolescent-centered research

*“To study resilience, one should adopt a fundamental humility about oneself and one’s culture and society and simultaneously a respect for the human strength of the other.” (Garbarino in [74], p. xiii)*

In this research adolescents are perceived as a social actor,



Graph 1. Overview of age distribution of questionnaire respondents (in %) ( $N=1873$ ).

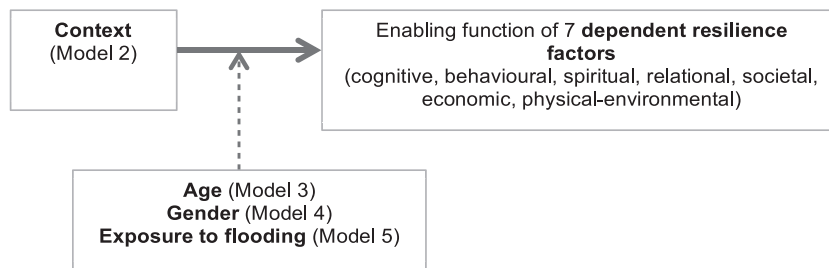


Fig. 1. The statistically explored relationships.

**Table 1**  
Overview of number of items and Cronbach Alpha values per resilience enabling factors.

	Total no. of items	Sub-factors	Cronbach Alpha	Cronbach Alpha Indonesia	Cronbach Alpha Burkina Faso	Cronbach Alpha Bolivia
<b>Individual resilience enabling model</b>	98	7	0.96	0.92	0.96	0.93
<b>1. Cognitive factor</b>	21	5	0.70	0.68	0.71	0.57
<b>2. Behavioral factor</b>	20	3	0.85	0.82	0.85	0.85
<b>3. Spiritual factor</b>	3	1	0.63	0.47	0.77	0.38
<b>4. Relational factor</b>	16	2	0.85	0.77	0.86	0.79
<b>5. Societal factor</b>	18	3	0.86	0.81	0.90	0.80
<b>6. Economic</b>	6	1	0.74	0.62	0.80	0.51
<b>7. Physical-environmental factor</b>	14	2	0.77	0.70	0.77	0.66

which implies respecting them as having their own experiences and understandings and acknowledging that they “act, take part in, change and become changed by the social and cultural world they live in” [17], p. 484]. This is in line with the new sociology of childhood in which it is emphasized that “in the ‘old’ sociology of childhood, others have been allowed to speak for children, effectively silencing them” (Oldman [61, p. 44] in [53, p. 327]). Scholars stress the lack of knowledge on adolescents and the need to learn more about their own experiences (see for example: [53,64,66,18,17,4]. During the research, methods and ethical procedures were adopted that respected adolescents as research participants in their own right and adhered to this value throughout the research process. For the questionnaire this had two key implications. Firstly, the key aim of the questionnaire was to gain insights on what adolescents perceive as the key factors enabling them to deal with flooding in their daily lives. Secondly, it implied that adolescents were involved in the development of the instrument and in each context the questionnaire questions were revised with adolescents to make them context sensitive. Qualitative participatory activities were organized in the three countries to enable this.

### 2.3. Dependent variables: the resilience enabling factors

The research sets out to study both internal and external factors that can be of importance to deal with flooding. Although context and culture are generally acknowledged to influence resilience, it has not resulted in many generalizable models or measurement designs. Given the lack of an applicable model, an “individual resilience enabling model” was developed consisting of seven resilience enabling factors namely: cognitive, behavioral, spiritual, relational, socio-political, economic, and physical/environmental (for theory see Section 3). These aspects were primarily derived from literature and Ungar *et al.*’s “multidimensional model of resilience” formed a guiding instrument. Both were adapted to be applicable to contexts with flood risk.

More specifically principal component analysis (PCA) was performed to transform 98-items into an “individual resilience

enabling model”, containing 7 main factors and 17 sub-factors [60]. Response patterns were used to explore the extent to which items matched each other and coherence in these response patterns guided the creation of the variables. Although the sub-factors were studied, the primary focus of analyses was on the seven main factors.

The data were tested in terms of normality of the residuals, homoscedasticity, linearity, independence of the errors and additionally, multi-collinearity.<sup>1</sup> To measure the reliability of the scale, the Cronbach’s Alpha was computed for all study variables. The Cronbach’s Alpha was also computed for the three contexts separately. The following Table 1 gives an overview of the amount of items used to construct the resilience enabling factors and the level of reliability (the Cronbach Alpha values) of the factors on a generic and a context specific level:

Table 1, shows that generally speaking the scale is reliable. However, the values show that both the spiritual and the economic factor are relatively less reliable. Given that they are both constructed with a smaller share of items this is understandable. Moreover, since the items related to spirituality were generally filled-out positively, the distribution of the spiritual factor proved to be skewed. In order to explore the quality of the data, which is fundamental for performing regression analysis, the assumptions for multiple regression analysis were tested.

### 2.4. Independent variable: context

The main aim of the statistical analysis was to study the association between context and the seven resilience enabling factors. To measure the influence of context on the resilience enabling factors, the item “country” (nominal variable) in the original questionnaire was used. In order to compare several groups within

<sup>1</sup> The tests showed that none of these assumptions were seriously violated, which meant that linear regression analysis could be performed. In terms of limitations, especially the scale of the spiritual factor and to certain extent that of the economic factor, show a lower reliability value (> 0.7). Although the assumptions were not seriously violated, the spiritual factor was also skewed in terms of the “normality of the residuals”.

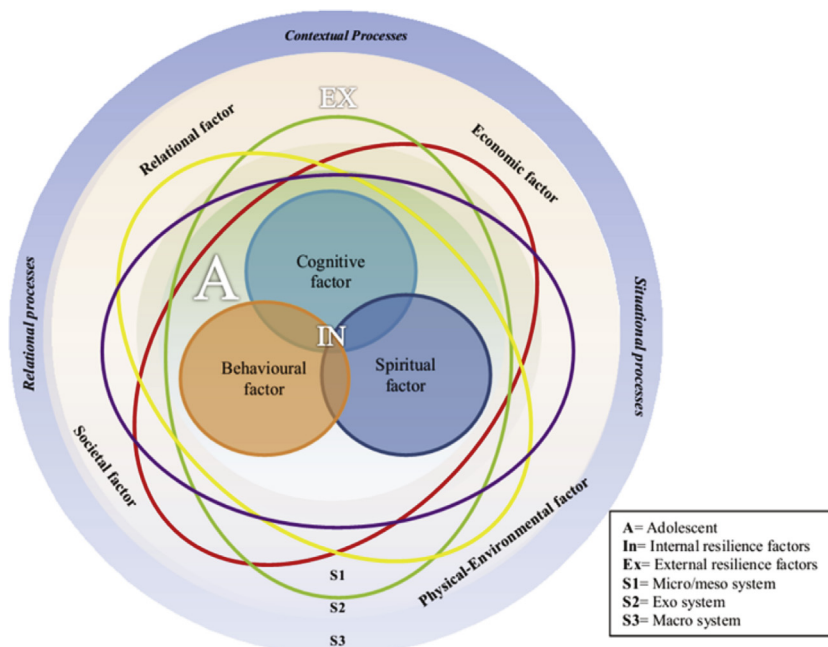


Fig. 2. Conceptual framework containing the resilience enabling model (In and Ex-layer).

one variable with each other, dummy variables were created, for all groups, minus the reference group. Nine control variables were used, to prevent the results of the actual relationship from being distorted and because they are also believed to be important characteristics of a context. Control variables included: gender, age, living with parents, being married, having children, years of received education, performing paid work, performing non-paid work and the level of exposure to flooding.

### 2.5. Statistical analysis

In order to identify the enabling function of the resilience factors (research questions 1 and 2), firstly the mean values and exact values of the factors were identified and secondly the mean values were categorized into groups ranging from a very low enabling function to a very high enabling function.

Thereafter, multiple regression analysis was performed to test the relationship between the seven resilience factors and context (research question 1). Fig. 1 shows the relationships that were explored.

The analysis started by identifying the influence of the earlier described control variables on the model (model 1). As visible in Fig. 1, to study the influence of context, the dummy variables were used (model 2). The influence of context was identified through the coefficient of determination ( $R$ ) and the  $R$ -square. The  $R$ -square represents the total amount of variance accounted for in the dependent variable by the independent variable [55, p. 32]. In order to judge the effect size of the  $R$  and  $R$ -square, Cohen's effect size index for power analysis of multiple regression analysis in the behavioral sciences was used [19, p. 412]. The index identifies an  $R$ -square of .02 as a small effect size, a  $R$ -square of .13 as a medium effect size and a  $R$ -square of .26 as a large effect size [19, pp. 412–414]. Although the exploration of the effect of context on the main dependent variables was the main interest, some additional analyses were also performed on a country level. For each dependent variable this was done by testing two- and three way interactions between “age and context” (2-way) (model 3), “gender and context” (2-way) (model 4), “exposure to flooding and context” (2-way) (model 5), “age  $\times$  gender” (2-way) (model 6) and “age  $\times$  gender  $\times$  context” (3-way) (model 7).

### 3. Theory

*“(…) Resilience is made of ordinary rather than extraordinary processes” [50, p. 227].*

Resilience has become a fashionable term in recent years, although the concept is far from novel. For example Alexander points out that the word already appears in writings of Seneca the Elder, Pliny the Elder, Ovid, Cicero and Livy [2], p. 2708]. The common understanding of resilience as “bouncing back” is explicable since the definition stems from the Latin words *resilire*, *resilio*, which signifies “to jump back”. Not unexpectedly, multiple and diverse definitions and interpretations of resilience exist. Mitchell and Harris argue that resilience fundamentally deals with how individuals, communities and systems deal with disturbance, surprise and change [57]. This study aims to specifically explore “human resilience” which refers to “an individual's capacity to recover from, adapt to, and/or remain strong in the face of adversity” [9, p. 1].

Although people have always been intrigued by stories of individuals who overcame adversity and succeeded in life, the systematic study of human resilience began around the 1960s and 1970s [52]. Generally speaking three ‘waves’ of resilience research can be identified [51,79, p. 287]. The first wave included research in the behavioral sciences, which emerged around 1970 and sought to understand and prevent the development of psychopathology [51]. Studies focussed on individual and individually mediated factors associated with positive outcomes. The second wave focussed on research which emphasized the temporal and relational aspect of positive development under stress [51,79]. Masten explains that the work attempted to move beyond description and to probe the processes that might account for differences observed in the first wave. Finally, the third and more recent wave of research has taken a more ecological interpretation of resilience, which includes perceiving resilience as an outcome of processes influenced by the child/adolescent context and culture. Moreover, researchers began designing and implementing experimental research and more frequently started offering suggestions for practice and policy, with warnings concerning the limited state of the knowledge at any given time [51,79].

Olsson et al. argue that process focussed resilience research



specifically aims at understanding the mechanisms or processes that act to modify the impact of risk, and the developmental processes which allow young people to adapt successfully [62, p. 3]. The resilience process thus comprises a series of events, actions or changes to augment the capacity of the affected individual or community when confronted with singular, multiple or unique shocks and stresses [49, p. 438]. Building on this idea, the approach of this study towards resilience on the one hand recognizes that communities have certain levels of resilience built over centuries, which consist of local adaptation strategies, culture, heritage, knowledge, and experience. On the other hand it also recognizes that certain human characteristics and skills, such as having disaster specific knowledge, can enhance resilience [62]. Manyena explains that the two approaches form the building blocks for boosting resilience (2006, p. 445).

The aim of this study is to operationalize resilience as a dynamic process of adaptation to adversity in which resilience is explored as a multi-factorial concept. Instead of focussing on one single factor, the study explores a set of resilience enabling factors that could lay the foundation to ensue a positive reaction, which leads to the desired resilience outcomes. A resilience enabling factor refers to something that modifies the effects of risk in a positive direction, it clearly has positive connotations and denotes resources, strategies, and power relations that are helpful or beneficial (based on the definition of [48, p. 106]). The set of internal factors include studying the enabling function of the cognitive, behavioral, and spiritual factor. The external factors take into account the enabling function of the relational, societal, economic, and physical/environmental factor. The contextual framework guiding the study is the following Fig. 2.

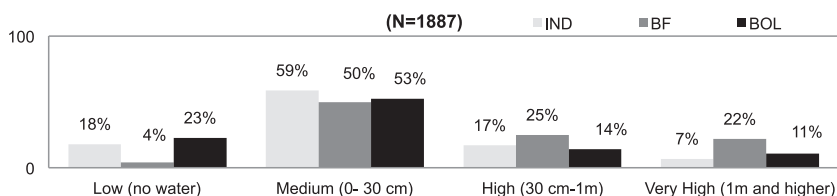
In terms of internal factors enabling flood resilience, the *cognitive factor* will be studied first. This includes exploring mental actions or processes of acquiring knowledge but also considering the attitudes and personal attributes that allow one to be prepared for, respond to and recover from flooding. Numerous scholars have identified that intelligence, personal attributes and sociability enable resilience (see for full list chapter 2 of de Milliano 2012 [38, p. 36]). Not only one's knowledge and attitudes enable resilience, but also the ways in which people behave in response to a particular situation are influential. Thus the *behavioral factor* includes exploring how adolescents behave and participate in flood risk environments. This factor has been chosen since scholars such as [15,28] and Harris [57], identified the importance of allowing young people to participate in and influence processes and activities. This participation is believed to increase their capacities and enlarge their opportunities to improve their well-being [36,45,46]. Lastly, the *relationship to a "higher being"* is identified to be an important internal feature for one's personal resilience. Research shows how spirituality provides people with a sense of security and well-being, better allowing them to deal with disasters [31,5,70].

A total of four external factors are studied, which are mainly based on the core assets of the livelihoods framework. The *relational factor* looks into how the relationships of adolescents allow them to deal with flooding. Scholars identify that close relationships (i.e. family and friends) perform an essential function for the

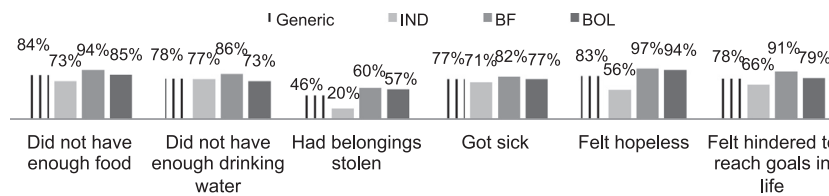
individual to deal with adversity [12,29,32,62,77,79,83,84]. The available, perceived and or received support has a resilience enabling function in times of hardship and adversity. The *societal factor* refers to issues related to society and its social relations, which include studying tangible and intangible forms of support provided to adolescents. This includes researching not only the support of key actors in the community but also identifying to what extent communities are inclusive to adolescents. Scholars identify that this space is essential to express agency and thus resilience [32,71,73,77]. The last two external factors include exploring the enabling function of the *economic and physical-environmental factor*. The access and possession of economic and material resources or financial and physical environmental capital in the family and community has been found to be of importance for young people to cope with a stressor. These assets allow adolescents and their families to achieve their livelihood objective or adopt different livelihood strategies in flood risk environments [21,3,54,69,72,8].

Finally a focus on context is added to the study since scholars emphasize that sensitivity to the need of heterogeneity is evident in the work of many of the best-known resilience researchers. Context in this study is understood as the "social, temporal and geographic location in which the culture is manifested" [74,80, p. 5]. Wyman highlights that: "in our future efforts to investigate resilience trajectories – and in our efforts to promote them – we should remain attentive to the fact that processes that are beneficial to children in one context may be neutral, or even deleterious, in another" [86]. Resilience research in the Western world has tended to focus on resilience to adversity, for example caused by divorce, parental death, abuse and or neglect [49, p. 434]. Moreover, apart from taking place in Western contexts, culture has also been treated as a confounding variable. If culture is included, it has usually been the focus of detailed studies seeking to understand how, for example, cultural minorities vary in their functioning from more mainstream groups [10,79]. Among other things, studies included research that contrasts positive outcomes of "healthy white middle-class heterosexual, able-bodied" populations with those of ethnic and racial minorities, both growing up in western societies. Studies often do not incorporate realities of non-Western adolescents who frequently face high levels of risk in their daily lives related to, for example, higher exposure to natural hazards, household poverty, poor health and low-quality housing [9,64]. In the "State of World's children 2011", Anthony Lake (Executive director of UNICEF) emphasized that in the global effort to save children's lives, too little is heard about adolescence [81]. He calls for greater action to support those in the life-phase which entails vulnerabilities, but is also a period of great opportunities.

Scholars emphasize that up until recently, surprisingly little systematic study has looked across populations and focussed on cultural systems. Some argue that a change in perspective is required, meaning: "turning the map of the world upside down" [78]. Western youth face numerous challenges, such as: anomie, obesity, delayed psychological maturation, lack of opportunities to contribute to one's communities. Subsequently, scholars like Ungar argue that: "one might speculate that a more equitable program of research would require the import of Majority World (non-



Graph 2. Exposure to flooding in the house/living environment (in %) (N=1887).



Graph 3. Impacts of flooding (N=1879) % of adolescents that identify to have experienced due to flooding.

Western) perspectives into the West and the accurate measure of the navigational advantage youth in less economically viable communities enjoy" [78, p. 169]. Given the lack of available knowledge, this research sets out to gain insights into personal, social and environmental conditions that enable adolescents in non-western context to deal with flooding.

## 4. Results

Before exploring what enables adolescents to be resilient, more insights are given on the adolescents' exposure and experience with flooding. Thereafter the section first presents the generic and thereafter the context-specific findings will be presented.

### 4.1. Resilience to what?

The focus of this research is flooding because if this event has disastrous impacts in the life of an adolescent, it causes tensions and stress to the individual and his or her environment. As mentioned previously, research was performed in areas where flooding occurs on a regular basis. All the adolescents that participated in the questionnaire lived in a community that was exposed to flooding at least once. Graph 2 shows the levels of flooding the adolescents are exposed to in the three countries:

Not only the adolescent's exposure to flooding was explored, also their perceived impact of the flooding was identified (see Graph 3).

The findings show that in all three countries, the flooding has both physical and psychological consequences. The vast majority of the adolescents identified to have experienced a lack of food (84%) and drinking water (78%) due to flooding and 77% fell ill due to the event. During a PRA activity, a female Bolivian adolescent emphasized, "living conditions are horrible when there is flooding". Diseases and other health issues were frequently mentioned as a negative impact of flooding and a male Burkinabè adolescent explains: "the flooding hinders people to be healthy and weakens the arms of the strong". Adolescents explained that they feel more tired and often are not motivated to undertake activities. In total 83% of the adolescents indicate to feel hopeless and 78% feel flooding hinders them reaching their goals in life. A female Burkinabè adolescent explains: "the youth are de-motivated because of their incredible tiredness". It is important to note however that the

adolescents did have a two-fold experience of the event. This was predominantly negative but at times could also be positive. Adolescents for example explained solidarity and brotherhood between the villagers and other communities increased. The following sections explore what factors helped the adolescents to deal with the flooding, which includes the preparation of, response to and recovery of the event.

### 4.2. What factors enable resilience?

To commence, a snapshot is taken of the resilience enabling model as a whole (see Graph 4).

Graph 4 shows that on a generic level, the model has a medium enabling function ( $M=3.28$ ,  $SD=0.53$ ). The external resilience factors ( $M=3.30$ ,  $SD=0.63$ ) have a slightly more enabling function than the internal resilience enabling factors ( $M=3.26$ ,  $SD=0.50$ ). Statistically significant positive correlations are present between the resilience enabling factors. This indicates that the factors change in the same positive direction and that if one of the factors is high, the other is also high. Scholars stress that correlations do not imply causation [67, p. 377].

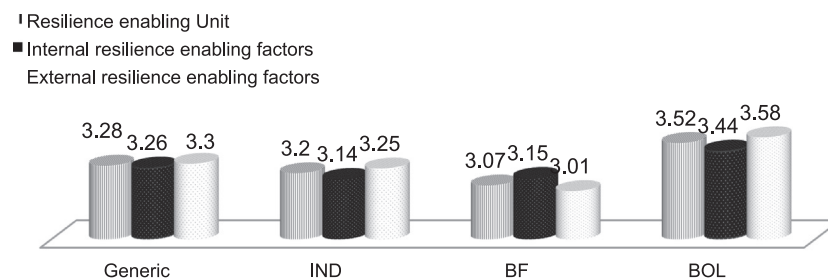
Graph 5 illustrates the function of the seven enabling factors.

Several issues are important to note. Firstly, none of the factors were identified to have a very low or low protective function. These data suggest the existence of a comprehensive set of internal and external factors enabling adolescents to deal with flooding, as opposed to a single enabling factor.

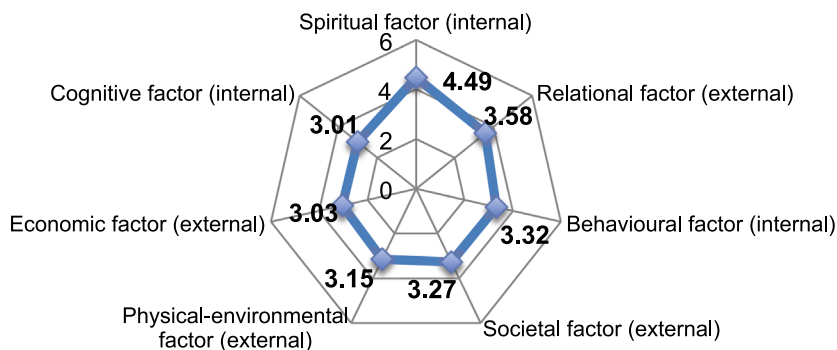
Secondly, there are high levels of alternation between the protectiveness of the internal and external factors, which suggests that in chorus, both personal traits (internal factors) as well as socio-environmental resources (external factors) have a protective function.

Finally, the order of importance of the various factors is highlighted. Spirituality and the adolescents' closest social environment (relational factor) are experienced to have a (very) high protective function, followed by their behavior, the societal support, their physical-environment, the economic factor and finally a set of cognitive traits.

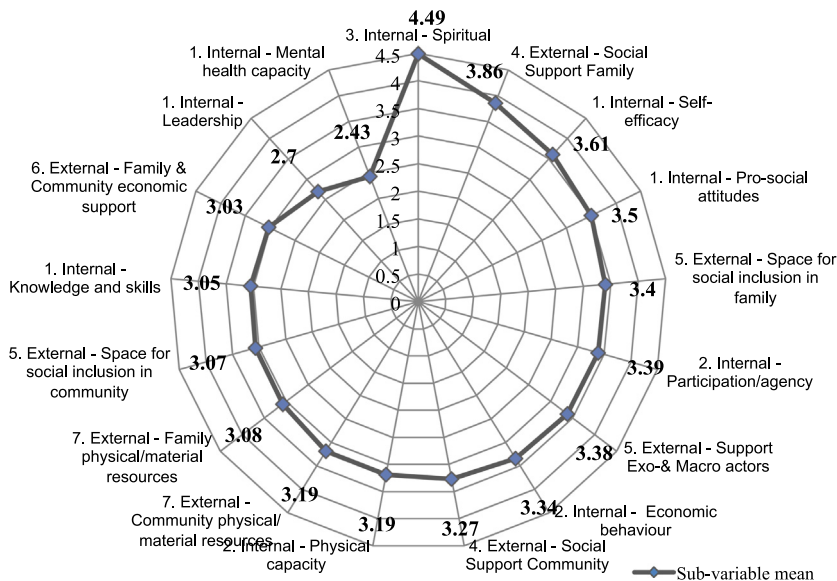
To further understand the influence of the internal and external factors on the resilience of the young, the processes and traits related to the seven factors were studied in more depth. Graph 6 presents the results of the sub-factors that enable resilience. Although differences are small, the findings firstly suggest that when dealing with flooding, the relationship to a "higher being" is



Graph 4. Enabling function of individual resilience model and broken down into internal and external factors (1=least enabling, 5=very enabling) N=1884.



Graph 5. The generic resilience enabling factors (1=little enabling, 5=very enabling).



Graph 6. Resilience enabling function of sub-factors (N=1884).

perceived to be very helpful and that prayers/rituals are a much employed protective strategy ( $M=4.49$ ).

Secondly, in line with Western literature, it was found that the micro environment (family and friends) of the adolescents is of great importance for their well-being and more specifically that the “closest” ties of the adolescent (parents, family and friends) are experienced to be most helpful ( $M=3.86$ ).

Thirdly, the questionnaire results point towards high levels of self-efficacy ( $M=3.61$ ) amongst the adolescents. This indicates that the adolescents feel a relatively high degree of control over flooding and its impacts, which is believed to be central in the subsequent orientation towards taking action to master the problem itself, or towards reducing emotional stress.

Fourthly, the adolescents show high levels of pro-social attitudes ( $M=3.5$ ) including: responsiveness to others, empathy and finally a high sense of duty to one-self and others. The findings show that they engage with other people, both on social and economic issues, in their individual and collective life. These are seen as important aspects for successful navigation and negotiation of well-being. The finding is striking as adolescents are often seen as passive victims and their agency and participation more often than not, goes unnoticed.

Finally, the space for social inclusion and being able and allowed to take part and have respectful relations with adults is worth highlighting. This space is mainly found in the family domain ( $M=3.4$ ) as compared to the community ( $M=3.07$ ). In terms of flood resilience, this is of importance since it is believed that adolescents, who are allowed to participate in and influence

processes and activities, will be able to increase their capacities, enlarge their access to opportunities and thus improve their well-being.

It the following section it will be explored, how these findings differ in the three contexts.

#### 4.3. How is variance caused by the difference in context?

The aim of this section is to explore the third research question: To what extent is variance in the enabling function of the resilience factors, caused by context?

Starting off with the resilience enabling model, Graph 4 in Section 4.2, shows that the resilience enabling factors are most enabling in Bolivia ( $M=3.52$ ,  $SD=0.42$ ), followed by Indonesia ( $M=3.20$ ,  $SD=0.43$ ) and lastly Burkina Faso ( $M=3.07$ ,  $SD=0.61$ ). On a context specific level, statistically significant positive correlations are present between the resilience enabling factors.

The findings point out that in terms of resilience enabling model, in Bolivia and Indonesia, the strengths and resources available to the adolescents from their environment (external factors) are slightly more enabling than those derived from personal characteristics. In contradiction to the other two contexts, in Burkina Faso the internal resilience enabling factors ( $M=3.15$ ,  $SD=0.55$ ) have a more protective function than the external resilience enabling factors ( $M=3.01$ ,  $SD=0.73$ ). The findings of the regression analysis confirm that the resilience enabling model has the most protective function in Bolivia, followed by Indonesia and



**Table 2**

Overview of the main findings of the regression analysis.

Factor and ranking based on mean value	Order of protectiveness	Context	R <sup>2</sup> (model 1) (%)	R <sup>2</sup> (model 2) (%)	Adolescents for whom the Factors offer most protective function <sup>***</sup>
Cognitive (7)	BOL, IND, BF <sup>*</sup>	BOL≠BF	25.6 <sup>**</sup>	5.6	Higher Age; males; more years of education; performing paid work; higher exposure
Behavioral (3)	BOL, BF, IND	BOL≠IND	17.2	4.9	Higher Age; males; performing paid work; Higher exposure
Spiritual (1)	IND, BOL, BF	BOL≠ IND BOL≠ BF	9.9	3.0	Not living with parents; not married; higher exposure
Relational (2)	IND/BOL, BF	BOL≠BF	14.1	3.3	
Societal (4)	BOL, BF, IND	BOL≠IND BOL≠BF	15.5	7.6	Males; more years of education; performing paid work; higher exposure
Economic (6)	IND, BOL, BF	BOL≠BF	21.5	4.1	Lower Age; males; performing non-paid work
Physical-environmental (5)	BOL, IND, BF	BOL≠IND BOL≠BF	22.5	6.1	Lower Age; males; being married; More years of education

<sup>\*</sup> BOL= Bolivia; IND= Indonesia; BF= Burkina Faso.<sup>\*\*</sup> Effect-size according to Cohen's effect size index (effect size of multiple correlation coefficients are: 2% - small; 13% medium; 26% large in [19]).<sup>\*\*\*</sup> Statistically significant findings.

lastly Burkina Faso.<sup>2</sup> Drawing on Cohen's effect size index, the  $R$  of 16.5% and  $R^2$  of 4.1% of context can be seen as a small-medium effect size [19]. This means that the extent to which variance in the enabling function of the model is caused by context is relatively small. For an overview of the detailed results of all the regression analyses, please consult [38], Annex IV.

After exploring the model as a whole, a more specific look can be given to the separate factors. Once again, regression analysis was performed to explore what variance was caused by context. The summarized results are presented in Table 2. The table includes the order of protectiveness of the seven factors in the three contexts, the similarities and disparities between the three contexts and influence of other factors.

What do the findings in the table tell us?

- A. The results show that although differences are relatively small, the resilience factors have the most protective function in Bolivia (for 4 factors) and/or in Indonesia (for 3 factors). Both the internal and external resilience factors offer adolescents in Burkina Faso less protection. In terms of levels of protectiveness of the factors, most similarity is found between Bolivia and Indonesia.
- B. The identified influence of context on the seven factors varies per factor. If the effect-size is purely based on "context" it generally accounts for small-medium levels of variance (see  $R^2$  (model 2)). It has most effect on the societal (7.6%), physical-environmental (6.1%) and cognitive factor (5.6%), followed by the behavioral (4.9%), economic (4.1%), relational (3.3%) and spiritual (3.0%) factor. However, a more representative analysis would be to base determination of resilience enabling factors on the effect of context, which includes the effect of the seven control variables since they represent key elements of a context (see  $R^2$  (model 1)). This would mean, the variance caused by context is medium-large and causes most variance in the cognitive (25.6%), physical environmental (22.5%) and economic factor (21.5%).<sup>3</sup> Context has a medium-small size of effect on the behavioral

(17.2%), societal (15.5%) and relational (14.1%) factor. Finally context was found to have a small-medium effect size on the spiritual (9.9%) factor.<sup>4</sup>

- C. There are some interesting findings when it comes to the experienced protective function of the resilience factors and the characteristics of adolescents. To begin with the sex of the respondent plays a clear role. As visible in the table, a majority of the resilience factors is experienced to have a more protective function for male adolescents than for female adolescents. Secondly age is found to play a role. The protective function of the internal resilience factors (cognitive and behavioral) increase as the adolescents' age increases and on the other hand, the protective function of the external factor (economic and physical-environmental) decreases, as they get older. Thirdly we find that adolescents with more exposure to flooding find more protection from the internal factors. Finally, education also proves to be of influence. Adolescents who have received more education find more protection in the cognitive factor and are socially more included.

## 5. Discussion and conclusion

After presenting the key findings, it is time to return to the four specific research questions and discuss which streams allow adolescent to emerge from their struggles. Moreover it will be discussed if these enabling streams are specific to the context or if they are similar wherever they flow. Table 3 sums up the findings of the first three specific research questions and presents what factors enable resilience (RQ1), to what extent they are internal or external (RQ2) and how much variance is caused by context (RQ3).

Some key insights can be drawn based on this.

Firstly it can be concluded that spirituality and the social relations of the adolescent, are perceived by adolescents as most enabling to be resilient. In all three countries, spirituality or "the relationship to a higher being", was found to offer adolescents a personal, social and ideologically rich context to deal with flooding. Of all the questionnaire respondents 45% ( $N=834$ ) identified to be Muslim, 36% ( $N=676$ ) Catholic, 10% ( $N=186$ ) Animist, 6% ( $N=106$ ) Evangelic, 2% ( $N=68$ ) affiliate with other religions and only 1% ( $N=14$ ) identified to not associate with any religion.

<sup>2</sup> Two regression models were analysed, of which in the first analysis (see [38], Annex IV, table I) nine control variables were used. The model explains 12.4% of variance ( $F(9, 1803)=50.095, p<0.01$ ). In the second model context is added as main predictor variable, to identify the main effects of context on the enabling function of the "resilience enabling model". The results of the analysis show that the second model explains 16.5% of variance ( $F(11, 7676)=32.358, p<0.01$ ). This means that an additional 4.1% of variance is explained ( $F$  change (2, 1802)=43.900;  $p<0.01$ ).

<sup>3</sup> Effect size is based on the level of effect caused by context and the seven control variables.

<sup>4</sup> It must be noted that for example the findings of the spiritual factor are understandable and should be read with caution. Since the vast majority of the respondents filled in the questions very positively, this leads to little variance in the answers and thus decreases the variance which context could potentially cause.

**Table 3**  
Summary of findings of statistical analyses.

The resilience enabling factors	Enabling function	Internal or external	Contextual ranking of order of protectiveness	The level variance explained by context ( $R^2$ )
1. Spiritual	Very High	Internal	IND, BOL, BF	Small/medium
2. Relational	High	External	IND/BOL, BF	Medium/small
3. Behavioral	Medium	Internal	BOL, BF, IND	Medium/large
4. Societal	Medium	External	BOL, BF, IND	Medium/small
5. Physical-environmental	Medium	External	BOL, IND, BF	Medium/large
6. Economic	Medium	External	IND, BOL, BF	Medium/large
7. Cognitive	Medium	Internal	BOL, IND, BF	Large

Although grounded in different types of religions, the vast majority of the adolescents explained that the relationship to a “higher being” provides them with a sense of security and well-being. In line with findings of for example [39], they emphasize that especially when life is dominated by insecurity and fear, they experience strength and confidence in life through this relationship. Submission to one's fate and resignation or trust in a “higher being”, gives them the feeling that their destiny is in the hand of “one who knows what is best for them”. The adolescents also emphasized that the role of prayer/ritual ceremonies is a common strategy to cope with a disastrous situation. An Indonesian adolescent explains: *“I pray to God/Allah and believe that the flooding is the gift of God/Allah. (...) Praying makes me calm, patient and stronger”*. Thus, ‘spirituality’ was found to offer adolescents a way of understanding hardship in their world and as Lindberg-Falk argues, *“it works because it answers to existential needs”* [47, p.96]. Although the empirical findings did not directly identify these facts, it is important to note that previous research also shows that children and adolescents have been harmed due to cultural practices perpetrated in the name of religion [20]. The findings emphasize the need for supplementary and detailed research to get more insights in the positive and negative functions of spirituality and religion for adolescent resilience.

Secondly, the study shows that in three totally different contexts that are prone to flooding, adolescents experience the support of their most “intimate” relationships as a highly enabling factor. This demonstrates that for adolescents exposed to flood risk in non-Western settings, the microsystem is found to be what Garbarino refers to as “a gateway to the world” and not a “locked room” (1992, p. 35). It confirms previous studies which found that these support systems are important resilience enabling factors in socially risky situations.<sup>5</sup> In line with these studies, it is also found that relations with parents and family members are more helpful than those with other community members. It is commonly found in rural/agrarian traditional societies, who are characterized by patrilineal family structures that the household carries out tasks such as agricultural production, consumption of goods and child care, jointly with kin. In areas with low levels of affluence and agricultural lifestyles, this shared responsibility is identified to be highly important for survival.

Friends were also found to be of importance, especially to share experiences, worries and spend leisure time with. In terms of dealing with flooding, parents and family members were prioritized much more strongly. When further analysing the data relatively lower importance was granted to the support and well-being of peers and friends in relation to flooding in Bolivia and Burkina Faso. For example 90% of the respondents identified the support of their parents as helpful and this was 71% when referring to the support of friends. In addition, when recovering from

flooding, ensuring good friendship was ranked least important of the 14 desired resilience outcomes.<sup>6</sup> This contrasts research performed in western societies (mainly by psychologists), that illustrates that in adolescence young people are likely to rely on their friends and peer groups as much as, if not more than, on their own families [7,14]; for discussions on friendship in cross-cultural contexts see [16,59]. It shows that although friendship and the support provided by and expected from peers are highly important, they are contextually constructed relations and can contrast with the representations about friends that are prominent in the popular discourse and social science in many western countries. Explanatory is a passage in a collection of poems from a Ghanaian author, which represents a common sight on friendship throughout West Africa: *“Beware of friends. Some are snakes under grass; Some are lions in sheep's clothing; some are jealousies behind their façades of praises; Some are just no good; Beware of friends.”* (Kyei and Schreckenbach [44, p. 95] in [1], p. 333). Summing up the importance of the relational factor, the analysis shows that although at times differently constructed, in all three contexts the family and community environment provide a powerful support to the adolescents, for coping with the stresses caused by flooding. The recognition of the relational potential can foster approaches that empower the sustainable processes long after the disasters have passed.

Thirdly, the high levels of self-efficacy and pro-social attitudes of adolescents, in combination with the space which they receive to participate in their family and community are worth highlighting. Instead of being passive, helpless, uncaring individuals, adolescents feel a relatively high degree of control over flooding, show a high sense of duty and high levels of empathy and responsiveness to others. This is eye-catching, because as explained in Section 3, Western youth are often seen to face challenges, such as: anomie, delayed psychological maturation, lack of opportunities to contribute to one's communities. The findings of this research show that the adolescents actively engage with other people, both on social and economic issues, in their individual and collective life. The space for social inclusion and being able and allowed to take part and have respectful relations with adults is mainly found in the family domain as compared to the community. This shows that the agency and participation of adolescents should not be overlooked. It is believed that adolescents, who are allowed to participate in and influence processes and activities, will be able to increase their capacities, enlarge their access to opportunities and thus improve their well-being. Is this an issue for which as [78] argue, it is require to change in perspective and

<sup>6</sup> The fourteen desired resilience outcomes included: physical health ( $M=4.82$ ,  $SD=0.47$ ), access to food and drinking water ( $M=4.72$ ,  $SD=0.54$ ), well-being of adolescents families ( $M=4.71$ ,  $SD=0.59$ ), spirituality ( $M=4.6$ ,  $SD=0.54$ ), daily routine ( $M=4.57$ ,  $SD=0.66$ ), the well-being of the community ( $M=4.47$ ,  $SD=0.73$ ), the safety of the adolescents material belongings ( $M=4.36$ ,  $SD=0.74$ ), safety of agriculture and livestock ( $M=4.29$ ,  $SD=0.87$ ), friendships ( $M=4.27$ ,  $SD=0.92$ ).

<sup>5</sup> See for example [59,76,42,10,32,12].

additionally “*turn the map of the world upside down*”?

Fourthly, it can be concluded that what helps adolescents to deal with flooding proves to be influenced by their sex, age and exposure to flooding. To begin with, the sex of the respondent shows to play a clear role. A majority of the resilience enabling factors is experienced to have a more protective function for male adolescents. This is in line with research that identifies that in non-western settings, adolescent men have more autonomy, mobility and access to developmental and economic opportunities. Secondly age is found to play a role. The protective function of the internal resilience factors (cognitive and behavioral) increase as the adolescents' age increases and on the other hand, the protective function of the external factor (economic and physical-environmental) decreases, as they get older. This finding seems plausible since one would expect adolescents' personal traits to develop as their age increases. Moreover as they become older, one could assume that they are expected to be more independent and economically and materially self-supporting and thus receive less assistance from their (social) environment. Thirdly we find that adolescents with more exposure to flooding find more protection from the internal factors. This suggests that they know better what to do; have higher levels of self-efficacy; pro-social attitudes; leadership skills; a better mental and physical health capacity and also participate more socially and economically. Finally, education also proves to be of influence. Adolescents who have received more education find more protection in the cognitive factor and are socially more included. This suggests that they know better what to do and receive more support from the key actors in the community and being allowed to participate in the community.

Lastly, the discrepancy between (1) the enabling function of a factor, (2) the variance caused by context and (3) the contextual interpretation and materialization of the factors in daily practice is worth underlining.

The findings point out that it depends on the factor whether context will either have a small, moderate or large influence. For the economic, physical-environmental, behavioral, and cognitive factor, moderate/large differences are found between the three contexts regarding their enabling function. This indicates that it depends on the context if it enables adolescents to deal with flooding. Taking the physical-environmental factor as an example: the qualitative research showed that Bolivia, compared to Indonesia and Burkina Faso, had more physical-environmental resources and strategies, such as DRR-related institutions, infrastructure and “early warning systems”, to facilitate flood resilience. This allowed adolescents in the Bolivian context to experience the physical-environmental factor as more enabling. For the spiritual, relational, and societal factor, the influence of context is smaller, indicating that the resilience enabling function is similar in the three contexts. This means that although a factor might materialize differently, it can still have a similar enabling function. The spiritual factor is an interesting example. In the three contexts, spirituality is grounded in different types of religions, from Islam to Animism. These religions all have different rituals, practices, values, and beliefs. Interesting is however, that although it manifests itself in a different form in all three contexts, it has a similar resilience enabling function.

It can thus firstly be concluded that in all three contexts both the qualities of the individuals and their environment allow adolescents to deal with flooding. High levels of alternation are identified between the protectiveness of the internal and external factors. This suggests that in chorus, personal traits (internal factors) as well as socio-environmental characteristics and resources (external factors) have a protective function. This challenges research which believes that resilience is either mainly an individual trait or a quality of the adolescent's social and physical ecology.

The interplay between the protective function of both internal and external factors, points out the importance of operationalizing resilience as a multi-factorial and interrelated concept. The fact that the generative force of context varies per factor, shows that it is relevant to know when it makes sense to assume similarities (likeliness) and when to focus on differences. This can be achieved by questioning per factor:

- How enabling is the factor in that context?
- How does the factor materialize in a context (requires a contextual interpretation)?
- How large is the effect of context on the enabling function of the factors?

The larger the influence of context, the more importance should be placed on a contextual approach. Especially since the influence of context is not an “either – or” issue, this three-way thinking allows for assuming a context specific resilience approach. The study makes it evident that instead of focussing on one single factor and assuming that what enables adolescent to be resilient is similar across the globe, it is more effective to understand resilience as a multi-factorial concept. Moreover it is essential to identify when to assume likeliness and when to take context specific approaches when aiming to contribute to positive adaptation.

## Acknowledgments

I am highly grateful to all the respondents (both young and older) who participated in the research. Many thanks go out to the various institutions that financially supported the research including the University of Groningen (the Netherlands), University College Dublin (Ireland), the European Commission, “Dr Hendrick Müller Foundation”, “Prins Bernhard Culture Foundation” and the “Groningen Research Institute for the Study of Culture” (ICOG).

## References

- [1] G. Adams, V.C. Plaut, The cultural grounding of personal relationship: friendship in North American and West African worlds, *Pers. Relationsh.* 10 (3) (2003) 333–347.
- [2] D.E. Alexander, Resilience and disaster risk reduction: an etymological journey, *Nat. Hazards Earth Syst. Sci. Discuss.* 1 (2013) 1257–1284.
- [3] M.B. Anderson, P.J. Woodrow, Rising from the Ashes: Development Strategies in Times of Disaster, Lynne Rienner Publishers, London, UK, 1998.
- [4] A. Babugura, Vulnerability of children and youth in drought disasters: a case study of Botswana, *Child. Youth Environ.* 18 (1) (2008) 126–157.
- [5] G. Bankoff, In the eye of the storm: the social construction of the forces of nature and the climatic and seismic construction of God in the Philippines, *J. Southeast Asian Stud.* 35 (01) (2004) 91–111.
- [6] B. Barbier, et al., Human Vulnerability to Climate Variability in the Sahel: Farmers' Adaptation Strategies in Northern Burkina Faso, *Environ. Manag.* 43 (5) (2008) 790–803.
- [7] R.R. Bell, *Worlds of Friendship Inc.*, Sage Publications, California, USA, 1981.
- [8] D.H. Bernat, M.D. Resnick, Healthy youth development: science and strategies, *J. Public Health Manag. Pract.* 12 (2006) S10.
- [9] J. Boyden, E. Cooper, Questioning the Power of Resilience: Are Children up to the Task of Disrupting the Transmission of Poverty, *Young Lives*, Department of International Development, University of Oxford, Oxford, 2007.
- [10] J. Boyden, G. Mann, Children's risk, resilience, and coping in extreme situations, *Handb. Work. Child. Youth: Pathw. Resil. Across Cult. Contexts* (2005) 3–26.
- [11] BPS, Statistik Potensi Desa. Provinsi Jawa Tengah. Village Potential Statistics of Province of Jawa Tengah 2008, BPS-Statistics Indonesia, Jakarta, Indonesia, 2008.
- [12] U. Bronfenbrenner, *The Ecology of Human Development: Experiments by Nature and Design*, Harvard University Press, Cambridge, MA, London, 1979.
- [13] J. Bruce, E. Chong, The Diverse Universe of Adolescents, and the girls and Boys left behind: A note on Research, Program and Policy Priorities. Background paper to the report Public Choices, Private Decisions: Sexual and Reproductive Health and the Millennium Development Goals, UN Millennium Project, New York, 2003.



- [14] W.M. Bukowski, *The Company They Keep: Friendship in Childhood and Adolescence*, Cambridge University Press, Cambridge, 1996.
- [15] L. Chawla, Evaluating children's participation: seeking areas of consensus. IIED children's participation—evaluating effectiveness, PLA Notes 42 (October) (2001) 9–13.
- [16] X. Chen, *Peer Relationships in Cultural Context*, Cambridge University Press, Cambridge, 2006.
- [17] P.H. Christensen, Children's participation in ethnographic research: Issues of power and representation, *Child. Soc.* 18 (2) (2004) 165–176.
- [18] P. Christensen, A. Prout, Working with ethical symmetry in social research with children, *Childhood* 9 (4) (2002) 477–497.
- [19] J. Cohen, *Statistical power analysis for the behavioural sciences*, 2nd ed., Lawrence Erlbaum, Hillsdale, NJ, 1988.
- [20] E. Crawford, M.O. Wright, A. Masten, Resilience and spirituality in youth, *Handb. Spirit. Dev. Childh. Adolesc.* (2006) 355–370.
- [21] DFID, 1999. DFID Sustainable Livelihoods Guidance Sheets.
- [22] DFO, 2010. Master Index of Inundation Maps. Dartmouth Flood Observatory. Space-based Measurement of Surface Water. Available at: (<http://www.dartmouth.edu/~floods/>).
- [23] van, D. Dijk, "Beyond their age": Coping of Children and Young People in Child-Headed Households in South Africa, African Studies Centre, Leiden, 2008.
- [24] El Ministerio para la Cooperación de Desarrollo del Reino de los Países Bajos, 2009. "Vivir con el Agua". Formulación de un plan de acción de prevención y gestión de riesgos de inundaciones en las llanuras del Beni. El Ministerio para la Cooperación al Desarrollo del Reino de los Países Bajos, Bolivia.
- [25] EM-DAT and Université Catholique de Louvain, 2011a. EM-DAT The International Disaster Database. Country Profile-Bolivia. The OFDA/CRED International Disaster Database. Available at: (<http://www.emdat.be/result-country-profile>).
- [26] EM-DAT and Université Catholique de Louvain, 2011b. EM-DAT The International Disaster Database. Country Profile-Burkina Faso. The OFDA/CRED International Disaster Database. Available at: (<http://www.emdat.be/result-country-profile>).
- [27] EM-DAT and Université Catholique de Louvain, 2011c. EM-DAT The International Disaster Database. Country Profile-Indonesia. The OFDA/CRED International Disaster Database. Available at: (<http://www.emdat.be/result-country-profile>).
- [28] A.O. Fatusi, M. Hindin, Adolescents and youth in developing countries, *J. Adolesc.* 33 (4) (2010) 499–509.
- [29] S. Fergus, Zimmerman, M.A., Adolescent resilience: a framework for understanding healthy development in the face of risk, *Annu. Rev. Public Health* 26 (2005) 399–419.
- [30] R. Few, Flooding, vulnerability and coping strategies: local responses to a global threat, *Prog. Dev. Stud.* 3 (1) (2003) 43.
- [31] J.C. Gaillard, P. Texier, Religions, natural hazards, and disasters: an introduction, *Religion* 40 (2) (2010) 81–84.
- [32] J. Garbarino, *Children and families in the social environment*, Aldine Publishing Company, New York, USA, 1992.
- [33] Gouvernement du Burkina Faso, 2009. Plan de Contingence: Plan National Multirisques de préparation et de réponse aux catastrophes, préparation, interventions de premier secours, réhabilitation et reconstruction.
- [34] D. Guha-Sapir, P. Hoyois, R. Below, Annual Disaster Statistical Review 2010: The Numbers and Trends, CRED, Brussels, 2014 [http://www.cred.be/sites/default/files/ADSR\\_2013.pdf](http://www.cred.be/sites/default/files/ADSR_2013.pdf).
- [35] D. Guha-Sapir, F. Vos, R. Below, S. Ponserre, Annual Disaster Statistical Review 2010: The Numbers and Trends, CRED, Brussels, 2011.
- [36] J. Hart, *Children's Participation in Humanitarian Action: Learning from Zones of Armed Conflict*, International Development Agency, Quebec, Canadian, 2004.
- [37] K. De Hauwere, L. van der Zouwen, Disaster Risk Reduction in Perspective(s). Actor perceptions and Interactions in a Flood Prone Area in Central Java, Indonesia (M.Sc. thesis Disaster Studies), Wageningen, Wageningen University, 2010.
- [38] C.W.J. De Milliano, *Powerful Streams. Exploring Enabling Factors for Adolescent Resilience to Flooding* (Ph.D. thesis), University of Groningen, Groningen, the Netherlands, 2012.
- [39] P.C. Hill, K.I. Pargament, Advances in the conceptualization and measurement of religion and spirituality: Implications for physical and mental health research, *Am. Psychol.* 58 (1) (2003) 64–74.
- [40] INE, 2002. Censo Nacional de Población y Vivienda 2001. Beni: Resultados Departamentales., La Paz, Bolivia: Instituto Nacional de Estadística.
- [41] INE, 2001. Censo Nacional de Población y vivienda 2001, Bolivia, La Paz, Bolivia: Instituto Nacional de Estadística.
- [42] Ç. Kağıtçıbaşı, Family, Self, and Human Development Across Cultures: Theories and Applications, 2nd ed., Lawrence Erlbaum Associates Publishers, Mahwah, New Jersey, London, 2007.
- [43] D.C. Kimmel, I.B. Weiner, *Adolescence: A Developmental Transition*, 2nd ed., Wiley, New York, 1994.
- [44] K.G. Kyei, H. Schreckenbach, No time to die, Catholic Press, Accra, Ghana, 1975.
- [45] G. Lansdown, Promoting Children's Participation in Democratic Decision-Making, UNICEF Innocenti Research Centre, Florence, 2001.
- [46] G. Lansdown, The Evolving Capacities of the Child, UNICEF Innocenti Research Centre, Florence, 2005.
- [47] M.L. Lindberg-Falk, Recovery and Buddhist practices in the aftermath of the Tsunami in Southern Thailand, *Religion* 40 (2) (2010) 96–103.
- [48] S.S. Luthar, J.A. Sawyer, P.J. Brown, Conceptual issues in studies of resilience, *Ann. N. Y. Acad. Sci.* 1094 (1) (2006) 105–115.
- [49] S. Manyena, The concept of resilience revisited, *Disasters* 30 (4) (2006) 433–450.
- [50] A.S. Masten, Ordinary magic: resilience processes in development, *Am. Psychol.* 56 (3) (2001) 227–238.
- [51] A.S. Masten, Resilience in children threatened by extreme adversity: frameworks for research, practice, and translational synergy, *Dev. Psychopathol.* 23 (02) (2011) 493–506.
- [52] A.S. Masten, J. Obradovic, Disaster preparation and recovery: lessons from research on resilience in human development, *Ecol. Soc.* 13 (1) (2007) 9.
- [53] S.H. Matthews, A window on the "New" sociology of childhood, *Sociol. Compass* 1 (1) (2007) 322–334.
- [54] K. Meursing, *A world of Silence. Living with HIV in Matabeleland*, Amsterdam: Royal Tropical Institute, Zimbabwe, 1997.
- [55] J. Miles, M. Shevlin, *Applying Regression and Correlation: A Guide for Students and Researchers*, Sage Publications Ltd., London, 2001.
- [56] C.W.J. de Milliano, Pat Gibbons. Child Participation' - a concept to consider. Lessons Learnt from Ecuador. In *Rebuilding Sustainable Communities for Children and Their Families After Disasters: A Global Survey*, edited by Adenrele Awotona, 185–205. U.K.: Newcastle upon Tyne: Cambridge Scholars Publishing, 2010.
- [57] Mitchell, T., Harris, K., 2012. Resilience: A Risk Management Approach. Background Note ODI.
- [58] H. Montgomery, R. Burr, M. Woodhead, *Changing Childhoods, Local and Global*, Johan Wiley & Sons Ltd., Chichester, 2003.
- [59] H.K. Montgomery, *An Introduction to Childhood: Anthropological Perspectives on Children's Lives*, Wiley-Blackwell Publishing, West-Sussex, UK, 2009.
- [60] D. Mortelmans, B. Dehertogh, *Factoranalyse*, Uitgeverij Acco, Leuven, 2008.
- [61] D. Oldman, Adult-Child Relations as Class Relations, in: J. Qvortrup, M. Bardy, G. Sgritta, H. Wintersberger (Eds.), *Childhood Matters: Social Theory, practice and politics*, Avebury, Aldershot, 1994.
- [62] C.A. Olsson, et al., Adolescent resilience: a concept analysis, *J. Adolesc.* 26 (1) (2003) 1–11.
- [63] Oxfam International, 2009. Bolivia Climate Change, Poverty and Adaptation. Oxfam International, La Paz, Bolivia.
- [64] L. Peek, Children and disasters: understanding vulnerability, developing capacities, and promoting resilience – an introduction, *Child. Youth Environ.* 18 (1) (2008) 1–29.
- [65] PRB, 2014. 2014 World Population Data Sheet. Available at: ([http://www.prb.org/pdf14/2014-world-population-data-sheet\\_eng.pdf](http://www.prb.org/pdf14/2014-world-population-data-sheet_eng.pdf)).
- [66] S. Punch, Research with children: the same or different from research with adults, *Childhood* 9 (3) (2002) 321–341.
- [67] S. Sarantakos, *Social Research*, 3rd ed., Palgrave MacMillan, New York, 2005.
- [68] J.M. Sawadogo, Coping with less rain in Burkina Faso. Officials, farmers and activists confront climate change, *Afr. Renew.* 21 (2) (2007).
- [69] A. Sen, *Development as Freedom*, Alfred A. Knopf, 1999.
- [70] T. Steinberg, *Acts of God: The Unnatural History of Natural Disaster in America*, Oxford University Press, New York, 2000.
- [71] Children, Young People and Social Inclusion: Participation for What?, in: E. K. Tisdall, et al., (Eds.), *The Policy Press*, Bristol, UK, 2006.
- [72] J. Twigg, Sustainable Livelihoods and Vulnerability to Disasters, Benfield Greig Hazard Research Center, London, UK, 2001.
- [73] M. Ungar, Community resilience for youth and families, *Child. Youth Serv. Rev.: Int. Multidiscip. Q. Rev. Welf. Young People* 33 (9) (2011) 1742–1749.
- [74] M. Ungar, Handbook for Working with Children and Youth: Pathways to Resilience Across Cultures and Contexts, Sage Publications Inc., California, USA, 2005.
- [75] M. Ungar, Resilience across cultures, *Br. J. Soc. Work* 38 (2) (2008) 218–235.
- [76] M. Ungar, Resilience across cultures, *Br. J. Soc. Work* 38 (2) (2008) 218.
- [77] M. Ungar, The social ecology of resilience: addressing contextual and cultural ambiguity of a nascent construct, *Am. J. Orthopsychiatry* 81 (1) (2011) 1–17.
- [78] M. Ungar, et al., The study of youth resilience across cultures: Lessons from a pilot study of measurement development, *Res. Hum. Dev.* 5 (3) (2008) 166–180.
- [79] M. Ungar, et al., Unique Pathways to Resilience across Cultures, *Adolesc. (San Diego): Int. Q. Devot. Physiol. Psychol. Psychiatr. Sociol. Educ. Asp. Second Decade Hum. Life* 42 (166) (2007) 24.
- [80] M. Ungar, L. Liebenberg, N. Didkowski, International Resilience Project, International Resilience Project, Nova Scotia, Canada, 2006.
- [81] UNICEF, The State of the World's Children 2011: Adolescence An Age of Opportunity, United Nations Children's Fund (UNICEF), New York, USA, 2011.
- [82] M. Vuille, et al., Climate change and tropical Andean glaciers: past, present and future, *Earth-Sci. Rev.* 89 (3–4) (2008) 79–96.
- [83] E.E. Werner, Resilience in development, *Curr. Dir. Psychol. Sci.* 4 (3) (1995) 81–85.
- [84] E.E. Werner, Risk, resilience, and recovery: Perspectives from the Icaui Longitudinal Study, *Dev. Psychopathol.* 5 (1993) 503–515.
- [85] B. Whiting, "Forward", in: *Inuit Youth: Growth and Change in the Canadian Arctic*, Rutgers University Press, New Brunswick, NJ, 1987, pp. xiii–xx.
- [86] P.A. Wyman, Emerging perspectives on context specificity of children's adaptation and resilience, in: S.S. Luthar (Ed.), *Resilience and Vulnerability: Adaptation in the Context of Childhood Adversities*, Cambridge University Press, Cambridge, 2003, pp. 293–317.
- [87] A.A. Yusuf, H. Francisco, Climate Change Vulnerability Mapping for Southeast Asia, Economy and Environment Program for Southeast Asia (EEPSEA), Singapore, 2009.